

## REMARKS

Applicants acknowledge receipt of an Office Action dated April 20, 2007. Claims 1-12 remain pending in the application.

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

### Statement of Substance of Interview

During a personal interview conducted on July 16, 2007, Examiner Hendrickson and Mr. Paul Strain discussed the rejections set forth in the outstanding Office Action.

### Rejection Under 35 U.S.C. §102/103

On page 2 of the Office Action, the PTO has rejected claims 1-4 and 8-12 under 35 U.S.C. §102(a) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over U.S. Patent 6,584,034 to Takamura *et al.* (hereafter “Takamura”) in view of U.S. Patent 5,364,984 to Arntz *et al.* (hereafter “Arntz”). Applicant respectfully traverses these rejections for the reasons set forth in their previously filed responses, and in view of the additional remarks below.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). See generally MPEP §2131.

Alternatively, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Applicant’s disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

Here, Takamura and Arntz each fail to disclose and, in the context of the alternative §103 rejection, collectively fail to teach, or suggest a method wherein “a carbon monoxide

adsorption amount is adjusted from 0.1 to 3 mL/cat.g" as recited in independent claims 1 and 12.

As an initial matter, Applicants wish to direct the PTO's attention to page 7, line 30 – page 8, line 27 of the present specification, which states:

In general, when using a noble metal, e.g. platinum as a main component of the catalyst, the oxidation and removal of carbon monoxide needs to be performed under a high temperature, since the carbon monoxide adsorption power thereof is large. In the treatment under a high temperature, side reaction such as reverse shift reaction or the methanation reaction may proceed. Therefore, the carbon monoxide reduction rate may decrease, or hydrogen may be consumed. Although it can be considered that the oxidation and removal of carbon monoxide is performed under a relatively low temperature, there is a problem that carbon monoxide cannot be sufficiently removed since the adsorption amount thereof on the noble metal increases under a low temperature. Thus, even though a side reaction such as reverse shift reaction and methanation reaction may be suppressed by keeping the temperature low, the carbon monoxide concentration cannot be efficiently reduced, since the conversion of carbon monoxide into carbon dioxide does not sufficiently proceed.

Moreover, concerning the oxidation and removal of carbon monoxide, it is necessary that more than certain amount of carbon monoxide adsorbs on a metal. However, when a noble metal element is used as a main component, the oxidation reaction does not easily proceed, because sites thereof that can supply active oxygen necessary for the oxidation reaction decrease due to excessive adsorption of carbon monoxide thereon.

Therefore, if a transition metal, which has ability to oxidize carbon monoxide and relatively small power to adsorb carbon monoxide, is used as a main component of the catalyst instead of a noble metal, the amount of oxygen to be adsorbed thereon is not so large even at a relatively low temperature. Hence, carbon monoxide can be efficiently oxidized and removed even under a low temperature. Moreover, since sites thereof that can supply active oxygen do not decrease, active oxygen can be sufficiently supplied. Thus, a good balance between adsorption and oxidation of carbon monoxide can be maintained.

(Emphasis added).

In the Office Action, the PTO has suggested that the 1% Pt of Takamura is not seen to differ from the 1% Pt of the examples of the present application. Applicants respectfully disagree and refer to the remarks set forth in their previously filed responses.

With this response, Applicants are submitting 2 tables for comparison. Table 1 provides a summary of the First and Second components of the Examples and Comparative Examples of the present application. Table 2 provides a summary of the First and Second components of the Examples and Comparative Examples of Takamura. In Table 1, the “5 wt%” of First components of Examples is discussed at page 14, line 20 – page 28, line 17 of the present specification.

Applicants acknowledge that Example 5 of Takamura includes 1 wt% platinum. However, in Example 5 of Takamura, the amount of First component (Ni) is 1.0 wt%. In response, catalysts of examples 1-16 and 23-27 of the present application contain platinum, rhodium *etc.* in an amount of 1 wt% and a First component in an amount of 5 wt%.

As described above, the First component (transition metal) of the examples of the present application differs vastly from that of Takamura. Specifically, the First components (which are used as a **main component** of the catalyst instead of noble metal) have the ability to oxidize carbon monoxide and have a relatively small power to adsorb carbon monoxide.

Applicants submit that, in view of these differences, it is not reasonable to presume that the compositions of Takamura will have the same properties as the presently claimed invention.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the outstanding rejection under §102.

### **Rejection Under 35 U.S.C. §103**

On page 2 of the Office Action, the PTO has maintained the rejection of claims 1-5 and 8-12 under 35 U.S.C. §103(a) as allegedly being unpatentable over Takamura. In addition, the PTO maintained the rejection of claims 6 and 7 under 35 U.S.C. §103(a) as allegedly being unpatentable over Takamura in view of U.S. Patent 6,913,739 to Shore (hereafter “Shore”). Finally, the PTO has maintained the rejection of claim 10 under 35 U.S.C. §103(a) as allegedly being unpatentable over Takamura in view of U.S. Patent

3,584,608 to Shibagaki (hereafter "Shibagaki"). Applicant respectfully traverses these rejections for the reasons set forth in their previously filed responses and in view of the additional remarks below.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, prior art references must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Applicants' disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

For the reasons discussed above, Applicant submits that Takamura fails to teach or suggest a method wherein "a carbon monoxide adsorption amount is adjusted from 0.1 to 3 mL/cat.g" as recited in independent claims 1 and 12 and that Shore and Shibagaki add nothing to resolve this fundamental deficiency in Takamura.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the outstanding rejection under §103.

### **CONCLUSION**

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. § 1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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Table 1

First Component	First Component Content (wt%)	Second Component	Second Component Content (wt%)	Carrier	SV (1/h)	CO Adsorption Amount (mL/cat·g)
Ex.1	Fe	5	Pt	1	Al <sub>2</sub> O <sub>3</sub>	100000 0.232
Ex.2	Co	5	Pt	1	Al <sub>2</sub> O <sub>3</sub>	100000 0.406
Ex.3	Ni	5	Pt	1	Al <sub>2</sub> O <sub>3</sub>	100000 1.009
Ex.4	Mn	5	Pt	1	Al <sub>2</sub> O <sub>3</sub>	100000 0.514
Ex.5	Cu	5	Pt	1	Al <sub>2</sub> O <sub>3</sub>	100000 1.100
Ex.6	Fe	5	Rh	1	Al <sub>2</sub> O <sub>3</sub>	100000 0.354
Ex.7	Co	5	Rh	1	Al <sub>2</sub> O <sub>3</sub>	100000 0.463
Ex.8	Ni	5	Rh	1	Al <sub>2</sub> O <sub>3</sub>	100000 2.741
Ex.9	Mn	5	Rh	1	Al <sub>2</sub> O <sub>3</sub>	100000 2.611
Ex.10	Cu	5	Rh	1	Al <sub>2</sub> O <sub>3</sub>	100000 2.362
Ex.11	Cu	5	Ru	1	Al <sub>2</sub> O <sub>3</sub>	100000 1.836
Ex.12	Cu	5	Pd	1	Al <sub>2</sub> O <sub>3</sub>	100000 0.963
Ex.13	Cu	5	La	1	Al <sub>2</sub> O <sub>3</sub>	100000 0.889
Ex.14	Cu	5	Nd	1	Al <sub>2</sub> O <sub>3</sub>	100000 0.912
Ex.15	Cu	5	Ce	1	Al <sub>2</sub> O <sub>3</sub>	100000 0.954
Ex.16	Cu	5	Pr	1	Al <sub>2</sub> O <sub>3</sub>	100000 0.902
Ex.17	Co	5	Pt	0.5	Al <sub>2</sub> O <sub>3</sub>	100000 0.248
Ex.18	Ni	5	Pt	0.5	Al <sub>2</sub> O <sub>3</sub>	100000 0.564
Ex.19	Cu	5	Pt	0.5	Al <sub>2</sub> O <sub>3</sub>	100000 1.006
Ex.20	Co	5	Pt	2	Al <sub>2</sub> O <sub>3</sub>	100000 0.856
Ex.21	Ni	5	Pt	2	Al <sub>2</sub> O <sub>3</sub>	100000 1.875
Ex.22	Cu	5	Pt	2	Al <sub>2</sub> O <sub>3</sub>	100000 1.551
Ex.23	Co	5	Pt	1	Mordenite	100000 0.302
Ex.24	Co	5	Pt	1	ZSM-5	100000 0.287
Ex.25	Co	5	Pt	1	SiO <sub>2</sub>	100000 0.245
Ex.26	Co	5	Pt	1	TiO <sub>2</sub>	100000 0.232
Ex.27	Co	5	Pt	1	ZrO <sub>2</sub>	100000 0.189
Com.Ex.1	Fe	5	—	—	Al <sub>2</sub> O <sub>3</sub>	100000 0
Com.Ex.2	Co	5	—	—	Al <sub>2</sub> O <sub>3</sub>	100000 0
Com.Ex.3	Ni	5	—	—	Al <sub>2</sub> O <sub>3</sub>	100000 0.003
Com.Ex.4	Mn	5	—	—	Al <sub>2</sub> O <sub>3</sub>	100000 0
Com.Ex.5	Cu	5	—	—	Al <sub>2</sub> O <sub>3</sub>	100000 0.631

Table 2

	First Component	First Component Content (wt%)	Second Component	Second Component Content (wt%)	Carrier	SV (1/h)
Ex.1	Co	0.5	Pt	0.5	Al <sub>2</sub> O <sub>3</sub>	13000
Com.Ex.1	Co	0.5	—	—	Al <sub>2</sub> O <sub>3</sub>	13000
Com.Ex.2	—	—	Pt	1.0	Al <sub>2</sub> O <sub>3</sub>	13000
Com.Ex.3	—	—	Ru	1.0	Al <sub>2</sub> O <sub>3</sub>	13000
Ex.2	Ni	0.5	Pt	0.5	Al <sub>2</sub> O <sub>3</sub>	6152
Ex.3	Ni	0.5	Pt	0.5	Al <sub>2</sub> O <sub>3</sub>	6152
Ex.4	Ni	1.0	Pt	0.5	Al <sub>2</sub> O <sub>3</sub>	6152
Ex.5	Ni	1.0	Pt	1.0	Al <sub>2</sub> O <sub>3</sub>	6609
Com.Ex.4	Ni	1.0	—	—	Al <sub>2</sub> O <sub>3</sub>	6152
Com.Ex.5	—	—	Pt	1.0	Al <sub>2</sub> O <sub>3</sub>	6152
Com.Ex.6	—	—	Ru	1.0	Al <sub>2</sub> O <sub>3</sub>	6152
Ex.6	Cu	0.25	Pt	0.75	Al <sub>2</sub> O <sub>3</sub>	5200
Ex.7	Cu	0.5	Pt	0.5	Al <sub>2</sub> O <sub>3</sub>	6200
Ex.8	Cu	0.75	Pt	0.25	Al <sub>2</sub> O <sub>3</sub>	6200
Ex.9	—	—	Pt	0.5	Cu-Zn-Al	11500
Com.Ex.7	Cu	1.0	—	—	Al <sub>2</sub> O <sub>3</sub>	6200
Com.Ex.8	—	—	Pt	1.0	Al <sub>2</sub> O <sub>3</sub>	6200
Com.Ex.9	—	—	Pt	1.0	Al <sub>2</sub> O <sub>3</sub>	5200
Com.Ex.10	—	—	Ru	1.0	Al <sub>2</sub> O <sub>3</sub>	6200
Com.Ex.11	—	—	—	—	Cu-Zn-Al	11500
Ex.10	Mn	0.5	Pt	0.5	Al <sub>2</sub> O <sub>3</sub>	6039
Ex.11	Mn	0.5	Pt	0.5	Al <sub>2</sub> O <sub>3</sub>	6039
Com.Ex.12	Mn	0.5	—	—	Al <sub>2</sub> O <sub>3</sub>	6039
Com.Ex.13	—	—	Pt	1.0	Al <sub>2</sub> O <sub>3</sub>	6152
Com.Ex.14	—	—	Ru	1.0	Al <sub>2</sub> O <sub>3</sub>	6152